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The Smile Starts at Home: Parental Impact on Paediatric Oral Health in Saudi Arabia: A Cross-Sectional Study

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Abstract **Background**: Early Childhood Caries (ECC) remains a highly prevalent and preventable oral condition worldwide, including in Saudi Arabia. Parental knowledge, attitudes and practices (KAP) strongly influence children's oral health outcomes. This study assessed parental KAP regarding children's oral health in Jeddah and explored sociodemographic factors influencing these practices. **Methods**: A cross-sectional survey was conducted among 257 parents of children aged 0-12 years in three districts of Jeddah. A validated bilingual questionnaire (Arabic/English) assessed demographics, knowledge, attitudes and practices. Stratified random sampling across schools, clinics and community centres was employed. Data were analysed using Chi-square tests, with $p<0.05$ considered significant. **Results**: Most parents recognized dental caries as a major childhood condition (75.5%) and identified its causes (86.8%). However, knowledge of preventive strategies such as dental sealants (26.5%) and recommended first dental visit (26.5%) was limited. Mothers, Saudi nationals and those with higher education and income demonstrated significantly better knowledge ($p<0.05$). Although 93.4% of children brushed daily, only 47.1% brushed for 2-3 minutes, 17.1% used dental floss and 39.7% attended regular dental checkups. Attitudinal assessment revealed that 68.2% of parents considered primary teeth important, yet 42.5% delayed the first visit until problems arose. **Conclusion**: While parents in Jeddah showed adequate general awareness, significant gaps persist in preventive knowledge, early dental visits and flossing. Targeted, culturally tailored education programs are essential to improve preventive practices and reduce ECC prevalence.

Key Words Early Childhood Caries, Parental Knowledge, Attitudes, Oral Health Practices, Saudi Arabia

INTRODUCTION

Children's oral health is a vital component of general health and well-being, closely influenced by parental knowledge, attitudes and behaviours. Among the most prevalent dental diseases in early childhood is Early Childhood Caries (ECC), a preventable condition that poses a significant public health challenge worldwide, particularly in low- and middle-income countries [1]. In Saudi Arabia, ECC remains highly prevalent and continues to affect the quality of life and development of young children [2-4]. ECC is characterized by the presence of one or more decayed, missing or filled tooth surfaces in any primary tooth in children under six years of age. Despite being largely preventable through proper oral hygiene practices and timely dental visits, ECC persists at alarmingly high rates [5,6].

Parental education, socioeconomic status and cultural beliefs have been consistently identified as key determinants of children's oral health. Studies from across the region and internationally support this association. In Kuwait, Alyahya found that higher levels of parental education correlated with improved oral hygiene behaviours in children [7]. In Saudi Arabia, Alshammari *et al.* reported moderate parental awareness in Dammam, with clear disparities based on socioeconomic status [8], while in Riyadh, Ansari *et al.* highlighted cultural misconceptions surrounding the perceived insignificance of primary teeth as a cause for delayed dental visits [9]. Globally, the American Academy of Paediatric Dentistry (AAPD, 2018) recommends the first dental visit to occur by the child's first birthday [10]. However, adherence to this guideline remains low in Saudi Arabia, where dental visits are often reactionary rather than preventive. In Saudi Arabia it was reported by Sabbagh and Alzain that many parents in Riyadh only sought dental care when their child was already experiencing dental problems,

resulting in more advanced and difficult-to-treat cases [11]. These findings align with international literature, which emphasized the critical role of early preventive measures in managing ECC [12,13]. Cultural beliefs and socioeconomic conditions significantly shape oral health behaviours and access to care. Studies show that misconceptions about the value of preventive care, such as flossing or regular check-ups, are prevalent in many provinces in Saudi Arabia [14-16]. ECC is defined as the presence of one or more decayed, missing or filled primary tooth surfaces in children under six years [5]. However, older children remain relevant when exploring parental practices, as oral hygiene behaviours established in early years extend into later childhood [6]. In Saudi Arabia, ECC prevalence remains high, with studies reporting rates between 62-80% among preschoolers [2-4]. Despite national initiatives, preventive care remains underutilized.

Parental influence is central to shaping oral health outcomes [7-9]. Mothers, in particular, play a pivotal role in establishing hygiene routines, dietary control and dental attendance. However, cultural misconceptions, such as the belief that primary teeth are unimportant or that dental care is necessary only when problems arise, remain barriers to prevention in Saudi Arabia [10-12].

While studies have been conducted in Riyadh, Dammam and Taif, limited evidence exists for Jeddah, a city characterized by socioeconomic and cultural diversity. This study therefore sought to evaluate parental knowledge, attitudes and practices (KAP) regarding children's oral health in Jeddah, while identifying demographic factors influencing these domains.

METHODS

Study Design and Setting

A cross-sectional study was conducted between January and April 2024 in Jeddah districts (Al-Safa, Al-Faisaliyah and Al-Nahda). Participants were recruited from community health centres, public dental clinics, primary schools and through online distribution.

Participants

- Inclusion criteria: Parents/guardians of children aged 0-12 years, residents of selected districts and those providing informed consent
- Exclusion criteria: Non-residents, individuals without children in the specified age group or those unwilling to consent

Sampling

Stratified convenience sampling was used to ensure inclusion across districts and facilities. Although power analysis indicated a minimum of 250 participants (medium effect size, $\alpha = 0.05$, power = 80%), the final sample included 257 respondents.

Data Collection Tool

A structured, validated bilingual (Arabic/English) questionnaire was administered. It assessed: (1) sociodemographic details, (2) knowledge of oral health, (3) attitudes toward preventive care and (4) practices. Internal consistency was confirmed (Cronbach's $\alpha = 0.82$). Pilot testing was conducted on 20 parents and minor modifications were incorporated.

Statistical Analysis

Data were analysed using SPSS v26.0. Descriptive statistics (frequency, percentage) summarized responses. Associations between KAP scores and sociodemographic variables were tested using Chi-square and Fisher's Exact Tests. A p-value<0.05 was considered statistically significant.

RESULTS

Sociodemographic Characteristics

Out of 257 participants, most were Saudi nationals (75.9%) and mothers (70.0%). The majority were between 26-45 years (61.5%) and resided in urban areas (98.1%). Over half had university education (61.1%), middle income (73.5%) and no chronic illness (71.2%) (Table 1).

Knowledge

Most parents knew caries is the most common dental disease (75.5%) and could identify causes (86.8%). However, only 26.5% knew about dental sealants and the correct timing for the first dental visit. Fluoride knowledge was moderate (57.6%). Overall knowledge levels: 44.1% good, 35.0% fair, 20.9% poor (Figure 1, Table 2-3).

Table 1: Sociodemographic characteristics of the participants

Parameters	Variable	N	%
Nationality	Saudi	195	75.9
	Not Saudi	62	24.1
Parent	Father	77	30.0
	The mom	180	70.0
Age of the parent	15-25 year	53	20.6
	26-35 year	81	31.5
	36-45 year	77	30.0
	46-55 year	27	10.5
	> 55 years	19	7.4
Residence	Urban/city	252	98.1
	Rural/village	5	1.9
Educational level	No primary education	5	1.9
	Primary	12	4.7
	Middle	18	7.0
	Secondary	65	25.3
	University	157	61.1
Employment	Employed	128	49.8
	Student	47	18.3
	Other	82	31.9
Marital status	Married	185	72.0
	Divorced	22	8.6
	Widow/widower	50	19.5
Income	Low	33	12.8
	Middle	189	73.5
	High	35	13.6
Number children	1	83	32.3
	2	60	23.3
	3	57	22.2
	4	57	22.2
Chronic disease	Nothing	183	71.2
	Diabetes Mellites	29	11.3
	Hypertension	20	7.8
	Other	25	9.7
Is this first child	No	131	51.0
	Yes	126	49.0

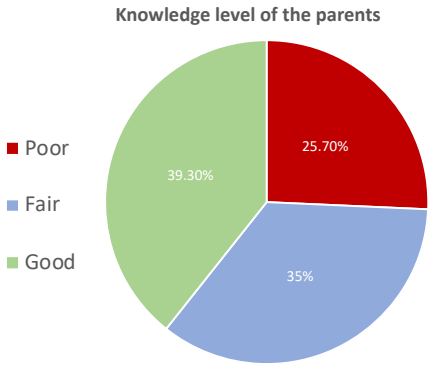

Figure 1: Knowledge level of the participants

Table 2: Knowledge about Dental Health

Question	Response	n (%)
Do you know that tooth decay is the most common dental disease among children?	Yes	194 (75.5%)
	No	63 (24.5%)
Do you know the benefits of primary prevention for teeth?	Yes	194 (75.5%)
	No	63 (24.5%)
Are tooth decay and gum diseases hereditary or acquired?	Acquired	214 (83.3%)
	Hereditary	43 (16.7%)
Do you know the factors that cause tooth decay?	Yes	223 (86.8%)
	No	34 (13.2%)
Do you understand the importance of monitoring your child's diet, including the type and quantity of sugar intake?	Yes	186 (72.4%)
	No	71 (27.6%)
Do you know what dental sealants are and why they are important for children?	Yes	68 (26.5%)
	No	189 (73.5%)
Do you know how to properly clean teeth with a toothbrush?	Yes	231 (89.9%)
	No	26 (10.1%)
Do you know the correct timing and frequency recommended for brushing teeth?	Yes	204 (79.4%)
	No	53 (20.6%)
Do you know the importance of fluoride for children?	Yes	148 (57.6%)
	No	109 (42.4%)
When should children first visit a dentist?	When teeth emerge	68 (26.5%)
	After one year	53 (20.6%)
	Do not know	136 (52.9%)

Attitudes

- 68.2% agreed that primary teeth are important
- 42.5% believed dental visits were only needed when problems occur
- 55.1% accepted sweets as unavoidable in children's diets

Practices

Although 93.4% reported regular brushing, only 47.1% of children brushed for 2-3 minutes and 17.1% used dental floss. Only 39.7% attended routine dental checkups every 3-6 months (Table 4-6).

DISCUSSION

The findings of this study reveal encouraging levels of general awareness among parents in Jeddah regarding children's oral health, particularly in relation to the causes and prevention of tooth decay. A significant proportion of respondents (75.5%) identified dental caries as the most common childhood oral disease and demonstrated a solid understanding of primary preventive measures. This aligns

Table 3: Knowledge Level by Demographic Variables

Parameter	Variable	Knowledge Level			P-value
		Poor n (%)	Fair n (%)	Good n (%)	
Nationality	Saudi	36 (18.5%)	73 (37.4%)	86 (44.1%)	<0.001
	Non-Saudi	30 (48.4%)	17 (27.4%)	15 (24.2%)	
Parent	Father	28 (36.4%)	22 (28.6%)	27 (35.1%)	0.035
	Mother	38 (21.1%)	68 (37.8%)	74 (41.1%)	
Age (years)	15-25	11 (20.8%)	20 (37.7%)	22 (41.5%)	0.184
	26-35	23 (28.4%)	24 (29.6%)	34 (42.0%)	
	36-45	18 (23.4%)	29 (37.7%)	30 (39.0%)	
	46-55	12 (44.4%)	10 (37.0%)	5 (18.5%)	
	>55	2 (10.5%)	7 (36.8%)	10 (52.6%)	
Residence	Urban/city	63 (25.0%)	88 (34.9%)	101 (40.1%)	0.112
	Rural/village	3 (60.0%)	2 (40.0%)	0 (0.0%)	
Educational level	No education	0 (0.0%)	4 (80.0%)	1 (20.0%)	<0.001
	Primary	11 (91.7%)	1 (8.3%)	0 (0.0%)	
	Middle	12 (66.7%)	4 (22.2%)	2 (11.1%)	
	Secondary	18 (27.7%)	28 (43.1%)	19 (29.2%)	
	University	25 (15.9%)	53 (33.8%)	79 (50.3%)	
Employment	Employed	39 (30.5%)	42 (32.8%)	47 (36.7%)	0.489
	Student	10 (21.3%)	16 (34.0%)	21 (44.7%)	
	Other	17 (20.7%)	32 (39.0%)	33 (40.2%)	
Marital status	Married	52 (28.1%)	60 (32.4%)	73 (39.5%)	0.349
	Divorced	3 (13.6%)	8 (36.4%)	11 (50.0%)	
	Widowed	11 (22.0%)	22 (44.0%)	17 (34.0%)	
Income	Low	17 (51.5%)	10 (30.3%)	6 (18.2%)	0.001
	Middle	46 (24.3%)	68 (36.0%)	75 (39.7%)	
	High	3 (8.6%)	12 (34.3%)	20 (57.1%)	
Number of children	1	24 (28.9%)	32 (38.6%)	27 (32.5%)	0.404
	2	18 (30.0%)	21 (35.0%)	21 (35.0%)	
	3	12 (21.1%)	16 (28.1%)	29 (50.9%)	
	4	12 (21.1%)	21 (36.8%)	24 (42.1%)	
First child	No	37 (28.2%)	48 (36.6%)	46 (35.1%)	0.354
	Yes	29 (23.0%)	42 (33.3%)	55 (43.7%)	

Table 4: Practices related to Dental Hygiene and Care

Question	Response	n (%)
Have you visited a dentist before?	Yes	251 (97.7%)
	No	6 (2.3%)
Do you regularly take your child for a dental checkup every 3-6 months?	Yes	102 (39.7%)
	No	155 (60.3%)
Do you replace your child's toothbrush every three months?	Yes	152 (59.1%)
	No	105 (40.9%)
Did you consult a dentist when your child's first tooth appeared?	Yes	93 (36.2%)
	No	164 (63.8%)
Did you take care to clean your child's gums before their teeth appeared?	Yes	120 (46.7%)
	No	137 (53.3%)
Do you regularly check your child's teeth at home?	Yes	95 (37.0%)
	No	90 (35.0%)
	Not Sure	72 (28.0%)

Table 5: Child's Oral Health Behaviours and Habits

Question	Response	n (%)
Does your child brush his/her teeth regularly?	Yes	240 (93.4%)
	No	17 (6.6%)
What type of toothbrush does your child use?	Normal	230 (89.5%)
	Electric	27 (10.5%)
Does your child know how to brush his/her teeth correctly?	Yes	229 (89.1%)
	No	28 (10.9%)
Have you taught your child the correct method of brushing teeth?	Yes	225 (87.5%)
	No	32 (12.5%)
Do you reward or praise your child during tooth brushing?	Yes	138 (53.7%)
	No	119 (46.3%)
Does your child brush his/her teeth for 2-3 minutes?	Yes	121 (47.1%)
	No	136 (52.9%)
Does your child use dental floss?	Yes	44 (17.1%)
	No	213 (82.9%)
Does your child brush his/her teeth more than once a day?	Yes	165 (64.2%)
	No	92 (35.8%)

Table 6: Dietary Habits and Oral Health Issues

Question	Response	n (%)
Does your child consume sugary food or drinks with meals or between meals?	Between meals	171 (66.5%)
	During meals	86 (33.5%)
Have you noticed any abnormalities or deformities in your child's mouth?	Yes	56 (21.8%)
	No	201 (78.2%)
Has your child complained about pain or discomfort in the mouth or gums?	Yes	149 (58.0%)
	No	108 (42.0%)
Does your child have other oral habits (e.g., thumb sucking, nail-biting)?	Yes	93 (36.2%)
	No	164 (63.8%)
Does your child receive an adequate amount of fluoride?	Yes	171 (66.5%)
	No	86 (33.5%)
What is the source of fluoride your child receives?	Toothpaste	151 (58.8%)
	Water	55 (21.4%)
	Topical application	17 (6.6%)
	Other	34 (13.2%)

with findings from a study in India by Mishra *et al.*, which also reported high parental recognition of caries and its preventability [19]. Furthermore, a majority of participants (83.3%) correctly believed that dental caries and gum diseases are acquired conditions rather than hereditary, which is consistent with the health education principles promoted by the American Academy of Paediatric Dentistry [20]. Similarly, the high proportion (86.8%) who understood the contributing factors of tooth decay supports the findings of a systematic review and recent meta-analysis by Khan *et al.* [21] done in Saudi Arabia, who stressed that parental knowledge of sugar consumption and oral hygiene practices significantly correlated with lower caries prevalence.

Knowledge about practical oral hygiene techniques was also strong, with 89.9% of participants indicating they knew how to brush properly and 79.4% correctly identifying the recommended frequency and timing of brushing. These results are comparable to those reported by AlShammari *et al.* in Dammam, where parents showed moderate to high awareness of oral hygiene routines [8]. However, the findings also revealed critical knowledge gaps. About 26.5% of parents were aware of the role and importance of dental sealants, which is a preventive intervention shown to be effective in reducing caries incidence, especially in molars as demonstrated by multiple studies [22-24]. This mirrors findings from Al-Agili *et al.* in Saudi Arabia, where parental knowledge of dental sealants was found to be very low, suggesting an ongoing need for targeted public education on preventive dental treatments. Furthermore, while 57.6% recognized the benefits of fluoride for children, this remains lower than ideal. In contrast, a study by Timms and colleagues exploring the experiences of parents in the UK and USA found that while the majority of parents in Sheffield (73%) and Colorado (72%) were willing to accept fluoride treatment for their children's posterior teeth, acceptance dropped to 58% for anterior teeth in both groups. Parental concerns about dental aesthetics significantly influenced acceptability, particularly for anterior teeth and also affected acceptance of posterior teeth in the UK sample, highlighting the aesthetic barrier to broader use of fluoride [26]. Perhaps the most concerning finding was that over half of the participants (52.9%) were unaware of the recommended timing for the child's first dental visit, with only 26.5% correctly identifying it as when the first tooth erupts. This gap is consistent with previous studies in Eastern Province and Riyadh province of Saudi Arabia, which also highlighted poor parental knowledge regarding early dental visits [18,27]. International guidelines, such as those by the AAPD, recommend the first dental visit by age one [10] and studies in countries like Latvia and Lithuania have shown higher parental compliance with these recommendations, particularly when early dental education is emphasized [28,29].

In our study Saudi parents had significantly better knowledge about children's oral health compared to non-Saudis (44.1% vs. 24.2%, $p<0.001$), a pattern that aligns with previous studies in Saudi Arabia suggesting that familiarity with local health education initiatives may contribute to increased awareness among nationals [8,30]. Mothers were also more knowledgeable than fathers (41.1% vs. 35.1%), which is consistent with global and regional literature emphasizing the central role of mothers in child health behaviours [30,31]. Educational attainment had a strong association with knowledge levels, with university-educated participants demonstrating the highest proportion of good knowledge, echoing findings by Mishra *et al.* and Al-Malik *et al.*, who highlighted the positive impact of higher education on oral health awareness [19,16]. Likewise, income level significantly affected knowledge, as higher-income families exhibited better knowledge compared to lower-income groups, a trend reported in both local and international studies [13,29,32]. Interestingly, no significant associations were found between knowledge and age, residence, employment, marital status, number of children or first-child status, suggesting that socioeconomic and educational variables may be more critical predictors than basic demographic characteristics, which is in contrastto some earlier assumptions that parenting experience alone improves oral health literacy.

The current study findings showed that while the vast majority of participants (97.7%) had taken their child to the dentist at least once, adherence to recommended preventive dental care practices was suboptimal. Fewer than half of the parents (39.7%) scheduled regular dental checkups every 3-6 months and only 36.2% sought dental consultation upon the eruption of their child's first tooth, reflecting poor compliance with early dental care guidelines recommended by the AAPD [10]. Additionally, less than half (46.7%) reported cleaning their child's gums before tooth eruption and only 37.0% regularly inspected their child's teeth at home, both of which are essential preventive measures for early detection and oral hygiene establishment. Nevertheless, a relatively higher proportion (59.1%) reported replacing their child's toothbrush every three months, which is consistent with recommended hygiene practices. These findings indicate a gap between awareness and consistent preventive behaviour, a pattern also demonstrated in studies from other Middle Eastern settings [27,33] emphasizing the need for reinforcing practical parental engagement through structured oral health education initiatives.

The study revealed generally positive oral hygiene habits among children, with most brushing regularly and demonstrating proper technique, likely influenced by the high rate of parental instruction reported. These findings align with Pullishery *et al.*, who noted that active parental involvement significantly shapes children's oral hygiene behaviour [34]. However, less than half met the recommended brushing duration of 2-3 minutes, reflecting a common gap between routine and best practices, as similarly observed in AAPD guidelines [10]. The minimal use of dental floss parallels results from AlShalan *et al.*, emphasizing the continued neglect of interdental cleaning in local populations [27. High consumption of sugary foods between meals remains a concern, reinforcing the established link between dietary habits and early childhood caries [35]. Compared to lower sugar intake levels reported in Canadian and European cohorts with strong parental regulation [28,32], these findings point to the need for dietary education. The presence of oral abnormalities and parafunctional habits such as thumb sucking suggests a behavioural component requiring attention through early intervention. While fluoride exposure was adequate in most children, it was primarily limited to toothpaste use, with limited contribution from water or professional applications. This differs from countries with systemic water fluoridation, where broader exposure enhances caries prevention [36].

This study highlights satisfactory parental awareness in Jeddah regarding general oral health but reveals significant deficiencies in preventive knowledge and practices. The low awareness of sealants (26.5%) and poor compliance with first dental visit guidelines (26.5%) are concerning. These findings align with earlier Saudi studies [8,11,25], emphasizing the gap between awareness and preventive behaviour.

The omission of preventive practices is critical, as fluoride and sealants significantly reduce caries incidence [22-25]. The attitudinal finding that nearly half of parents delayed dental visits until problems arose reflects a reactive care model, inconsistent with AAPD recommendations [10].

Sociodemographic analysis showed mothers, higher-educated and higher-income parents demonstrated superior knowledge, consistent with prior Saudi and international studies [19,30-32]. However, reliance on Chi-square testing without multivariate models limits conclusions about independent predictors.

Clinically, the high sugar consumption (66.5%) and low flossing rates (17.1%) indicate an urgent need for behaviour-focused education. School-based interventions and parent-focused campaigns are warranted.

CONCLUSIONS

Parental knowledge of general oral health in Jeddah is encouraging, yet preventive gaps, especially regarding sealants, early visits, flossing and brushing duration, remain pronounced. Mothers and higher socioeconomic groups exhibit better awareness, but misconceptions persist. Tailored education programs addressing cultural and behavioural barriers are essential to reduce ECC prevalence. Future studies should integrate longitudinal and interventional designs with clinical assessments.

Ethical Statement

Approval was obtained from the Ethics Committee of Batterjee Medical College (Approval No: BMC-REC-2024-011). Written/electronic informed consent was obtained from all participants. Confidentiality and anonymity were assured.

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